

Dr. Natalie J. Lemanski

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Postdoctoral Experience

University of California, Los Angeles, CA
Department of Ecology and Evolutionary Biology
Postdoctoral Fellow, June 2018- May 2020

University of Tennessee, Knoxville, TN
Department of Ecology and Evolutionary Biology
Postdoctoral Fellow, Sept 2017- May 2018

Education

Rutgers University, New Brunswick, NJ
Doctor of Philosophy in Ecology and Evolution, August 2017
Advisor: Dr. Nina H. Fefferman
Dissertation title: A quantitative framework for investigating life history trade-offs in social insects
GPA 4.0

University of Maryland, College Park, MD
Bachelor of Science in Ecology and Evolution, May 2010
Minor: Earth History
High honors: Summa Cum Laude

Research Interests

- How the environment shapes collective behavior in social insects
- Resource allocation and life history evolution in social insects
- The effect of behavior on disease transmission in social groups
- The role of environmental constraints in the evolution of social organization

Publications

Lemanski, NJ, Schwab, SR, Fonseca, DM, & Fefferman, NH. 2020. Coordination among neighbors improves the efficacy of Zika control despite economic costs. *PLoS Neglected Tropical Diseases*, 14(6): e0007870. <https://doi.org/10.1371/journal.pntd.0007870>.

Cook, CN, **Lemanski, NJ**, Mosqueiro, T, Ozturk, C, Gadau, J, Pinter-Wollman, N, & Smith, BH. 2020. Individual learning phenotypes drive collective behavior. *Proceedings of the National Academy of Sciences*, In Press. Preprint at *bioRxiv*: <https://doi.org/10.1101/761676>.

Lemanski, NJ, Cook, CN, Smith, BH, & Pinter-Wollman, N. 2019. A multiscale review of behavioral variation in collective foraging behavior in honey bees. *Insects*, special issue on *Honeybee Neurobiology and Behavior*, 10(11), 370. <https://doi.org/10.3390/insects10110370>.

- Myers, K, DeNegre, A, Gallos, L, **Lemanski, NJ**, Mayberry, A, Redere, A, Schwab, SR, Stringham, O, & Fefferman, NH. 2019. Dynamic *ad hoc* social networks in improvised intelligence/counter-intelligence exercises: A Department of Homeland Security red-team blue-team live-action role play. *Journal of Homeland Security and Emergency Management*, 17(10).
<https://doi.org/10.1515/jhsem-2018-0027>.
- Lemanski, NJ** & Fefferman, NH. 2018. How life history shapes optimal patterns of senescence: implications from individuals to societies. *American Naturalist*, 191(6).
<https://doi.org/10.1086/697225>.
- Lemanski, NJ** & Fefferman, NH. 2017. Coordination between the sexes constrains the optimization of reproductive timing in honey bee colonies. *Scientific Reports*, 7, 2740.
<https://doi.org/10.1038/s41598-017-02878-8>.
- Lemanski, NJ**, Cook, CH, Ozturk, C, Smith, BH, & Pinter-Wollman, N. 2020. The effect of individual learning on collective foraging in honey bees in complex environments. Manuscript in review. Preprint at *bioRxiv*, <https://doi.org/10.1101/817270>.
- Lemanski, NJ**, Bansal, S, & Fefferman, NH. 2020. Seasonal differences in colony sensitivity to worker mortality predict patterns of worker senescence in honey bees. Manuscript in review. Preprint at *In Review*, <https://doi.org/10.21203/rs.3.rs-23691/v1>.

Oral Presentations

- Individual learning affects collective decision-making for honeybee colonies foraging on variable quality food sources. Southern California Animal Behavior Symposium. February 2020. University of California, San Diego, CA.
- How individual learning affects collective foraging behavior in differently structured landscapes. Behaviour. July 2019. University of Illinois, Chicago, IL.
- The strength of selection on worker mortality predicts seasonal differences in honeybee worker senescence rate. International Union for the Study of Social Insects (IUSI). August 2018. Guaruja, Brazil.
- Sensitivity of a honeybee colony to worker mortality depends on seasonal context. Ecological Society of America. August 2017. Portland, OR.
- A game of drones: when should honey bee workers kick out the lazy males? Invited talk. October 2016. Princeton University, Princeton, NJ.
- The matrix bee-loaded: measuring seasonal differences in colony sensitivity to worker mortality in honey bees. Social Insects in the Northeast RegionS (SINNERS). December 2016. George Washington University, Washington, DC.
- How can honey bees (*Apis mellifera*) optimize the fitness trade-off between drone production and swarming? International Congress of Entomology. September 2016. Orlando, FL.
- Coordination between the sexes constrains the optimization of reproductive timing in honeybee colonies. Ecological Society of America. August 2016. Ft. Lauderdale, FL.
- A game of drones: when should honeybee workers kick out the lazy males? Invited talk. March 2016. Arizona State University, Tempe, AZ.

Non-parametric distributed algorithms for network based anomaly detection. Mathematical Biosciences Institute Workshop: Generalized Network Structures and Dynamics. March 2016. Ohio State University, Columbus, OH.

How can honeybees optimize the fitness trade-off between queen and drone founded swarms? Social Insects in the Northeast RegionS (SINNERS). December 2015. University of Scranton, Scranton, PA.

To bee or not to bee: A decision theory approach to explaining aging in honeybee workers. International Union for the Study of Social Insects (IUSSI). July 2014. Cairns, Australia.

Modeling the evolution of group behavior in social insects. Social Insects in the Northeast RegionS (SINNERS). May 2013. New Jersey Institute of Technology, Newark, NJ.

Self-assemblage formation in neo-tropical army ants. Penn, Princeton, Rutgers and Columbia (PPRC) Ecology and Evolution Student Conference. April 2013. Columbia University, New York, NY.

Grants, Awards, and Certificates

National Science Foundation INCLUDES program WATCH US (Women Achieving Through Community Hubs in the United States) mini-grant, Oct 2017

Teaching with Technology Certificate from Rutgers Center for Teaching Advancement and Assessment Research (CTAAR), Spring 2017

Rutgers University TA/GA Professional Development Fund Award, Feb 2016

International Union for the Study of Social Insects-North America Section Student Travel Award, June 2014

Special Study Opportunity and Pre-Dissertation Award from Rutgers Graduate School, New Brunswick, March 2013

Programming Skills

Python, Matlab, R, and AMPL

Teaching Experience

Quantitative Genetics Lab, Teaching Assistant, Rutgers University (Sept 2014 – May 2017)

- Assisted in conversion from a traditional classroom course to an entirely online course
- Led lectures, covering principles of genetic inheritance, hypothesis testing, data analysis, and bioinformatics tools
- Designed assignments and examinations emphasizing critical reasoning and application

Biological Research Lab, Teaching Assistant, Rutgers University (Jan - May 2014)

- Taught practical laboratory skills, such as sterile technique, pipetting, DNA extraction, PCR, and gel electrophoresis
- Mentored students in independent research projects involving designing, performing, and presenting results on their own experiments

General Biology Workshop, Teaching Assistant, Rutgers University (Sept 2012 - Dec 2013)

- Led students in active learning activities to improve learning and studying effectiveness

- Helped to develop and evaluate new examination material as part of course-wide effort to improve evaluation of student performance

Behavioral Biology, Teaching Assistant, Rutgers University (Jan-May 2012)

- Led recitation session to help students understand course content
- Assisted in writing exams and evaluating the effectiveness of course material
- Guided students in the completion of independent research papers on animal behavior

General Biology Lab, Teaching Assistant, Rutgers University (Sept- Dec 2011)

- Led students in examining, comparing and identifying organisms from different phylogenetic groups
- Led students in dissection of fetal pigs and other specimens for anatomical instruction
- Mentored students in writing a lab report, based on the results of in-class experiments

Social Psychology Lab, Teaching Assistant, University of Maryland (Sep-May 2010)

- Mentored students in designing and carrying out independent research projects in social psychology
- Taught statistical analysis in SPSS
- Mentored students in analyzing data and presenting results

Mentoring Experience

Currently mentoring an undergraduate in developing a network model of disease transmission in social spiders (UCLA, 2019-2020)

Led three undergraduate assistants in collecting field data on honeybee foraging behavior (Arizona State University Honey Bee Research Lab, 2018-2019)

Co-organized peer networking workshop for women in mathematics, in which female graduate and undergraduate students worked in groups to produce video interviews of female faculty in mathematical biology (University of Tennessee, 2018)

Mentored an undergraduate in developing a population model of the effect of honey bee worker senescence on colony demography, which resulted in a presentation and a manuscript in review (Rutgers University, 2017)

Outreach/Community Engagement

Moderator, UCLA Undergraduate Research Showcase, May 2020

Volunteer, Will Rogers Elementary School STEM Night, with UCLA Advancing Women in Science and Engineering (AWiSE), November 2019

Ecology & Evolution Graduate Student Association (EcoGSA) Diversity Club, Rutgers University, 2016-2017

Raritan Valley Beekeepers Association, 2015-2017

Lead organizer, EcoGSA community book sale, Rutgers University, April 2017

Rutgers Geology Museum Late Night educational event, March 2017

Secretary, EcoGSA, Rutgers University, Fall 2015 – Spring 2016

Oral session moderator, Mathematical Biosciences Institute Workshop: Generalized Network Structures and Dynamics, Ohio State University, Columbus, OH, March 2016

Volunteer judge, North Jersey Regional Science Fair, March 2015

Vice President, EcoGSA, Rutgers University, Fall 2012 – Spring 2014

Member of Rutgers Graduate Student Association Sustainability Board, Fall 2011– Spring 2013